UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,686	04/02/2004	Masae Sasano	50335-051	9775

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EXAMINER
ALHIJA, SAIF A

ART UNIT	PAPER NUMBER
2128	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/815,686	SASANO ET AL.
	Examiner	Art Unit	
	SAIF A. ALHIJA	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>05 May 2008</u>.

2a)☒ This action is FINAL.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>6-10</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>6-10</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>02 April 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   Claims 6-10 have been presented for examination.

Claims 1-5 have been cancelled.

Response to Arguments

2.   Applicant's arguments filed 5 Mary 2008 have been fully considered but they are not persuasive.

NON-PRIOR ART ARGUMENTS

i)   The Claim Objection of claim 10 is withdrawn in view of Applicants arguments.

PRIOR ART ARGUMENTS

ii)   Applicants argue that **Mattsson** does not teach **"defining an abstract class by extracting characteristics common to a plurality of similar parts contained in each category if these parts need to be distinguished for the purpose of calculation."** As cited in the previous office action the reference states **Mattsson**, Page 3 right column, **"The statement "extends BasicLiquid" means that the model BasicLinearLiquid inherits all properties of BasicLiquid."** This statement clearly reads on the abstract class recited in the claim since the subclass BasicLinearLiquid inherits aspects of its parent BasicLiquid. Applicants have not addressed the merits of the rejection which cited the term BasicLinearLiquid as well as the proceeding paragraph which includes BasicLiquid.

iii)   Applicants argue that the combination of references does not teach **"combining a tube class and fin class into the cell class as categories among which models that represent phenomena occurring in the cells are independent of one another."** As stated in the previous office action the use of abstract classes which represent parts of the heat exchanger model, **Mattson** Page 3, left column **in combination with** the modeling of the tube and fin of the heat exchanger in **Judge**, Page 247 would have been obvious to one of ordinary skill in the art at the time of the invention since the use of abstract class is well known in computer programming and the aspects of the heat exchanger being modeled are also well known as shown by the citations provided of Judge and Mattson. With respect to common characteristics see the definitions of BasicLiquid and BasicLinearLiquid which define pressure, temperature, density, etc... The Examiner notes that Applicants have merely combined the well known methodology of class abstraction used in object oriented programming with well known physical aspects of a heat exchanger and as such the combination of references renders the claimed invention unpatentable. This further applies to claim 9 in

view of the citations of Judge reciting refrigerant and air. The Examiner further argues that it would have been

obvious to combine the teachings of the prior art to render the claimed invention unpatentable in view of **KSR, 550**

U.S.at ___, 82 USPQ2d at 1391 which reads "The Supreme Court further stated that: <u>When a work is</u>

<u>available in one field of endeavor</u>, design incentives and other market forces can prompt variations of it,

either in the same field or a different one. <u>If a person of ordinary skill can implement a predictable variation,</u>

<u>§ 103 likely bars its patentability</u>. For the same reason, if a technique has been used to improve one device,

<u>and a person of ordinary skill in the art would recognize that it would improve similar devices in the same</u>

<u>way, using the technique is obvious unless its actual application is beyond his or her skill.</u> **Id. at ___, 82**

USPQ2d at 1396." (Emphasis added) The Examiner cannot see how a person of ordinary skill in the art would

lack the skill to combine the references nor can the Examiner see how the use of abstract classes in combination

with heat exchanger modeling would be unpredictable.

EXAMINERS NOTE

      iv)   The Examiner has cited particular columns and line numbers in the references applied to the

claims for the convenience of the applicant. Although the specified citations are representative of the teachings of

the art and are applied to specific limitations within the individual claim, other passages and figures may apply as

well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in their

entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by

the prior art or disclosed by the Examiner.

      v)   The Examiner respectfully requests, in the event the Applicants choose to amend or add new

claims, that such claims and their limitations be directly mapped to the specification, which provides support for the

subject matter. This will assist in expediting compact prosecution.

      vi)   Further, the Examiner respectfully encourages Applicants to direct the specificity of their response

with regards to this office action to the broadest reasonable interpretation of the claims as presented. This will avoid

issues that would delay prosecution such as limitations not explicitly presented in the claims, intended use

statements that carry no patentable weight, mere allegations of patentability, and novelty that is not clearly

expressed.

PRIORITY

3.   Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set

forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth
> in section 102 of this title, if the differences between the subject matter sought to be patented and the prior
> art are such that the subject matter as a whole would have been obvious at the time the invention was made
> to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be
> negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are

applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as

follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.
4.   Considering objective evidence present in the application indicating obviousness or
       nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35

U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time

any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the

obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly

owned at the time a later invention was made in order for the examiner to consider the applicability of 35

U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4.   **Claim(s) 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sven Erik Mattsson, "On**

Modeling of Heat Exchangers in Modelica", hereafter Mattsson, in view of Judge et al. "A Heat Exchanger

Model for Mixtures and Pure Refrigerant Cycle Simulations" hereafter referred to as Judge.

Regarding Claim 6:

The references disclose A computer-implemented method for using a computer system to configure a simulation program executable by a computer processor for computing amounts of heat exchanged, comprising the steps of:

classifying models which represent phenomena occurring in various components of an apparatus for producing refrigeration effect by means of heat exchange between refrigerant and air into categories independent of one another; **(Mattson discloses classifying models into various phenomena components, see page 3, Liquid Models more specifically the definitions of BasicLiquid and BasicLinearLiquid as well as categories independent, specifically the different defined parameters. With respect to the refrigeration effect, see 103 rejection below)**

defining the resulting categories as classes; **(Mattsson. Page 3, definition of BasicLinearLiquid)**

defining an abstract class by extracting characteristics common to a plurality of similar parts contained in each category if these parts need to be distinguished for the purpose of calculation; **(Mattsson. Page 3, definition of BasicLinearLiquid as well as the paragraph following the definition)**

providing, under the abstract class, as many subclasses which inherit characteristics of the abstract class as there are necessary types of parts to be distinguished; **(Mattsson. Page 3, definition of BasicLinearLiquid as well as the paragraph following the definition)**

implementing a phenomenological model of each defined class; **(Mattsson. Page 3, Liquid Models)**

and creating a computer-implemented simulation program executable by the computer processor in an object-oriented language based on the classes. **(Mattsson. Page 3, Liquid Models, Simulation Runs. MODELICA)**

Mattsson does not explicitly disclose the heat exchanger as a refrigeration unit with refrigerant and air.

However, Judge discloses a heat exchanger utilizing refrigerant and air. **(See Judge Abstract)**

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the refrigerant heat exchanger in **Judge** for the modeling in **Mattsson** since a refrigerant/air heat exchanger is merely one type of well known heat exchangers. **(See Judge Abstract)**

Regarding Claim 7:

The references disclose A computer-implemented method for using a computer system to configure a simulation program executable by a computer processor for computing amounts of heat exchanged, comprising the steps of:

defining a compressor class, tube class, and heat exchanger class as categories among which models that represent phenomena occurring in a refrigeration system for producing refrigeration effect by means of heat exchange between refrigerant and air are independent of one another;

defining an abstract class by extracting characteristics common to a plurality of similar parts contained in each class if such parts exist;

providing, under the abstract class, as many subclasses which inherit characteristics of the abstract class as there are necessary types of parts to be distinguished;

implementing a phenomenological model of each defined class;

and creating a computer-implemented simulation program executable by the computer processor in an object-oriented language based on the classes.

See rejection for claim 6.

With respect to the **compressor/tube/heat exchanger classes** it would have been obvious to incorporate classes for components of the heat exchanger system in **Judge**, for example the compressor **(Judge. Page 245 Introduction, compresssion system)** and tube **(Judge. Page 247, Tube and Fin)** with the modeling in **Mattsson** since these are parts of the well known heat exchangers discussed in the rejection for claim 6.

Regarding Claim 8:

    The references disclose A computer-implemented method for using a computer system to configure a simulation program executable by a computer processor for computing amounts of heat exchanged according to claim 7, comprising the steps of:

    composing the heat exchanger class by combining individual cells in a cell class;

    combining a tube class and fin class into the cell class as categories among which models that represent phenomena occurring in the cells are independent of one another;

    defining a refrigerant class for a working fluid which interacts with the tube class; defining an air class for a working fluid which interacts with the fin class;

    defining an abstract class by extracting characteristics common to a plurality of similar parts contained in each of the tube class and fin class if such parts exists;

    defining, under each abstract class, as many subclasses which inherit characteristics of the abstract class as there are necessary types of parts to be distinguished;

    implementing a phenomenological model of each defined class;

    and creating a simulation program in an object-oriented language based on the classes.

    See rejection for claim 6.

    With respect to the **heat exchanger/tube/fin/refrigerant classes** it would have been obvious to incorporate classes for components of the heat exchanger system in **Judge**, for example the tube/fin (**Judge. Page 247, Tube and Fin**) and refrigerant (**Judge. Abstract**) with the modeling in **Mattsson** since these are parts of the well known heat exchangers discussed in the rejection for claim 6.

Regarding Claim 9:

The references disclose A computer-implemented method for using a computer system to configure a simulation program executable by a computer processor for computing amounts of heat exchanged, comprising the steps of:

composing a heat exchanger which produces refrigeration effect by means of heat exchange between refrigerant and air, by combining individual cells in a cell class;

combining a tube class and fin class into the cell class as categories among which models that represent phenomena occurring in the cells are independent of one another;

defining a refrigerant class for a working fluid which interacts with the tube class;

defining an air class for a working fluid which interacts with the fin class;

defining an abstract class by extracting characteristics common to a plurality of similar parts contained in each of the tube class and fin class if such parts exists;

defining, under each abstract class, as many subclasses which inherit characteristics of the abstract class as there are necessary types of parts to be distinguished;

implementing a phenomenological model of each defined class;

and creating a computer-implemented simulation program executable by the computer processor in an object-oriented language based on the classes.

See rejection for claim 6.

With respect to the **heat exchanger/tube/fin/refrigerant/air classes** it would have been obvious to incorporate classes for components of the heat exchanger system in **Judge**, for example the tube/fin **(Judge. Page 247, Tube and Fin)**, refrigerant **(Judge. Abstract)**, and air **(Judge. Abstract, "refrigerant to air condensers")** with the modeling in **Mattsson** since these are parts of the well known heat exchangers discussed in the rejection for claim 6.

Regarding Claim 10:

    The reference discloses A storage medium containing a simulation program which makes a computer implement the functions described in any of claims 6 - 9. **(See rejections for claims 6-9)**

Conclusion

5.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

    A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

6.   All Claims are rejected.

7.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to SAIF A. ALHIJA whose telephone number is (571)272-8635. The examiner can normally be reached on M-F, 11:00-7:30.

    If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571) 272-22792279. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information

Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR

or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more

information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the

Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Kamini S Shah/

Supervisory Patent Examiner, Art Unit 2128

SAA

August 10, 2008